

ABSTRACT

In hydrate-based desalination or other water purification conducted using naturally buoyant or trapped-gas-assisted buoyancy hydrate in a hydrate fractionation column, a portion of fresh or purified product water is extracted from an upper, hydrate dissociation region of the fractionation column and reintroduced into a lower portion of the fractionation column at a point above but generally near a product water/saline water interface. The difference in density between the reintroduced product water and the fluid in the hydrate fractionation column above the point of reintroduction (water, hydrate, and gas) drives a natural circulation system which enhances the rate at which hydrate rises into the hydrate dissociation region.